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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,657	11/15/2001	Fredrik Henn	0226-0112P	7524

2292 7590 09/09/2004

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
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EXAMINER
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NOLAN, DANIEL A

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/987,657

**Applicant(s)**

HENN ET AL.

**Examiner**

Daniel A. Nolan

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2001.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-9 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 15 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/09/2002.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "603" has been used to designate both "Bit Demand Analysis" and "buffer fullness analysis module" (in figure 6 – see page 7 lines 16-17).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. Figures 1-3 should be designated by a legend such as - - Prior Art - - because only that which is old is illustrated. See MPEP § 608.02(g).

Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The abstract of the disclosure is objected to because "adaptation" is misspelled (3<sup>rd</sup> line). Correction is required. See MPEP § 608.01(b).

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4. The disclosure is objected to because of the following informalities:

- "continuous" is misspelled (page 2 line 5 line).
- "adaptation" is misspelled (page 6 line 23).

Appropriate correction is required.

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Continual Estimation and Adjusting by Crossover Frequency to Improve High Frequency Reconstruction Coding".

### ***Claim Objections***

5. Claim 1 is objected to because of the following informalities:

- Abbreviations, acronyms and formula elements must be defined when they first appear in the specification and in the claims. In line 2 of claim 1, "HFR" should read  
- - HFR (high frequency reconstruction) - - .

Appropriate correction is required.

6. Claims 6 and 8 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claims are not further treated on the merits.

7. It is noted without objection that claim 9 contains the adjective "high" (line 31).  
It is suggested to use a more precise definition.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 1 is a single claim that claims both an apparatus and the method steps of using the apparatus, and so is indefinite under 35 U.S.C. 112, second paragraph because it would not be evident to a practitioner whether construction of the system or practice of the method would infringe on the invention. See in Ex parte Lyell, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990). MPEP 2173.05(p), Claim Directed to Product-by-Process or Product and Process, ¶ II. *Product and Process in the Same Claim*, 1<sup>st</sup> paragraph.

***Claim Rejections - 35 USC § 101***

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claim 1 is rejected under 35 U.S.C. 101 because a single claim which claims both an apparatus and the method steps of using the apparatus is rejected based on the theory that the claim is directed to neither a "process" nor a "machine," but rather embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. See in Ex parte Lyell, 17 USPQ2d 1551 (Bd. Pat. App. & Inter. 1990). MPEP 2173.05(p), Claim Directed to Product-by-Process or Product and Process, ¶ II. *Product and Process in the Same Claim*, 2<sup>nd</sup> paragraph.

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Taniguchi et al & Kamai et al**

Claims 1, 2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al ("A High-Efficiency Speech Coding Algorithm based on ADPCM with Multi-Quantizer", International Conference on Acoustics, Speech, and Signal Processing, April 1986) in view of Kamai et al (U.S. Patent 6,490,562 B1).

15. Regarding claim 1 as understood by the Examiner, Taniguchi et al read on the features of the claim as follow:

- Taniguchi et al teach the feature of a *method for improving the performance of a natural audio coding system comprising of a core codec (the ADPCM-MQ – see lines 4-5 in the right column page 1721) for coding of a lower frequency band (2<sup>nd</sup> line right column page 1721) reaching up to a crossover frequency (the crossover*



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being determined by the results of Equation 3 – see lines 7-8, 2<sup>nd</sup> paragraph left column page 1722), and

- Taniguchi et al teach the feature of a *an HFR system for generation of a higher frequency band* (the QMF-2 of figure 1) *starting at the crossover frequency* (Equation 3 in left column page 1722)
- Taniguchi et al teach detecting the value of the crossover frequency (lines 7-13, 2<sup>nd</sup> paragraph left column page 1722) but does not disclose doing so *adaptively over time*. Kamai et al, with the invention for *analyzing voices* teach the feature to *adaptively over time select the value of the crossover frequency* (with the *cut-off or center frequency* being the same as *crossover* in column 2 lines 39-54). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Kamai et al to the device/method of Taniguchi et al to avoid degrading those audio segments that do not conform to an initial determination.

16. Regarding claim 2, the claim is set forth with the same limits as claim 1.

Taniguchi et al read on the feature *that the value is derived from a measure of the degree of difficulty of encoding a signal with the core codec* (where the last 5 lines in the right column page 1721 teach the relation between performance and *degree of difficulty* - see 1<sup>st</sup> paragraph right column page 1722) *and a high degree of difficulty lowers the value, and a low degree of difficulty increases the value* (inherently taught that increasing and decreasing the quantizers representing *difficulty* with relation to S/N &

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process loads produces corresponding results of figure 5 – see lines 18-19 2<sup>nd</sup> paragraph right column page 1722).

17. Regarding claim 9, Taniguchi et al read on all the features of the claim for a *natural audio coding system* as follows:

- Taniguchi et al teach the feature *for coding of a lower frequency band* (2<sup>nd</sup> line right column page 1721) *reaching up to a crossover frequency* (the crossover being determined by the results of Equation 3 – see lines 7-8, 2<sup>nd</sup> paragraph left column page 1722), *and*
- Taniguchi et al teach the feature *for high frequency reconstruction of a higher frequency band* (lines 10-12, left column page 1723) *starting at the crossover frequency* (with *crossover frequency* determining the sub-band splitting – see lines 19-22 in left column page 1723).
- Taniguchi et al teach the feature *for selection of the value of the crossover frequency* (lines 7-13, 2<sup>nd</sup> paragraph left column page 1722) but does not disclose doing so *adaptively over time*. Kamai et al, with the invention for *analyzing voices* teach the feature to *adaptively over time select the value of the crossover frequency* (with the *cut-off or center frequency* being the same as *crossover* in column 2 lines 39-54). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Kamai et al to the device/method of Taniguchi et al to avoid degrading those audio segments that do not conform to an initial determination.

**Taniguchi et al, Kamai et al & Moses**

18. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al in view of Kamai et al and further in view of Moses (U.S. Patent 5,404,377 A).

19. Regarding claim 3, the claim is set forth with the same limitations as claim 2. Neither Taniguchi et al nor Kamai et al mention *perceptual entropy*. Moses, with the invention for *simultaneous transmission of data and audio signals by means of perceptual coding*, teaches the feature *that the measure is based on the perceptual entropy of a signal* (column 2 lines 23-25). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Moses to the device/method of Taniguchi et al & Kamai et al because more sophisticated descriptions of the audible error provide improved correlation with subjective performance, in particular, the amount, distribution, and correlation of error with original signal improve prediction of error subjectivity.

**Taniguchi et al, Kamai et al & Shoham et al**

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al in view of Kamai et al and further in view of Shoham et al (U.S. Patent 5,646,961 A).

20. Regarding claim 4, the claim is set forth with the same limitations as claim 2. Neither Taniguchi et al nor Kamai et al mention *distortion energy*. Shoham et al, with

the *method for noise weighting filtering*, teaches the feature *that the measure is based on the distortion energy after coding with the core codec* (column 1 lines 52-65). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Shoham to the device/method of Taniguchi et al or Kamai et al to eliminate noise while maintaining volume at the level needed to hear by reducing the *audibility* of errors without affecting the *energy*.

**Taniguchi et al, Kamai et al & Rossum et al**

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al in view of Kamai et al and further in view of Rossum et al (U.S. Patent 5,928,342 A).

21. Regarding claim 5, the claim is set forth with the same limitations as claim 2. Neither Taniguchi et al nor Kamai et al mention *any reservoir*. Shoham et al, with the *audio effects processor integrated on a single chip with a multiport memory onto which multiple asynchronous digital sound samples can be concurrently loaded*, teach the feature *that the measure is based on the status of a bit-reservoir associated with the codec* (with the *buffer* of the AC97 codec serving as a *reservoir* and when  $\frac{1}{2}$  the buffer size is reached – see column 4 line 45 & column 5 lines 3-9). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Rossum to the device/method of Taniguchi et al and/or Kamai et al, using the well-known technique of evaluating a

sample frame in the I/O transient area before making a determination or commitment to the next process or to an alternate processing method.

**Taniguchi et al, Kamai et al & Herre et al**

22. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al in view of Kamai et al and further in view of Herre et al (U.S. Patent 6,424,939 B1).

23. Regarding claim 7, the claim is set forth with the same limitations as claim 2. Taniguchi et al does not mention *any border*. Herre et al, with the *method for coding an audio signal*, read on the feature *that a border between a tonal and a noise-like frequency range of an input signal is detected* (column 9 lines 27-30), and [that] the *value corresponds to the border* (column 9 lines 43-46). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Herr to the device/method of Taniguchi et al and/or Kamai et al to find or recognize noise-like or noisy spectral values in the entire spectrum of the audio signal.

***Conclusion***

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Hollier ("Error Activity And Error Entropy As A Measure Of Psychoacoustic Significance In The Perceptual Domain", IEE Proceedings – Vision, Image and

Signal Processing, June 1994) more sophisticated descriptions of the audible error provide improved correlation with subjective performance, in particular, the amount, distribution, and correlation of error with original signal improve prediction of error subjectivity.

- Vinay et al ("Context-Based Error Recovery Technique for GSM AMR Speech Codec", International Conference on Acoustics, Speech, and Signal Processing, May 2002) context-based error recovery technique for the CELP-based speech codec accomplishing recovery of erased frames, updating decoder state during erasure spells and reliable estimation of codec parameters makes use of implicitly available codec parameters and buffers for parameter estimation.
- Bode (U.S. Patent 4,158,751 A) speech encoder and decoder having a high-frequency bypass determined by crossover frequency.
- Veldhuis et al (U.S. Patent 4,896,362 A) subband coding of a digital audio signal with high-frequency processing determined by cut-off (crossover) frequency.
- Johnston (U.S. Patent 5,285,498 A) for coding audio signals based on perceptual model differentiates high-band processing with crossover frequency (claim 4).
- Ananthaiyer et al (U.S. Patent 6,385,548 B2) for detecting and characterizing signals in a communication system as tone or noise.
- Erten (U.S. Patent Publication 2002/0116197 A1) audio-visual speech processing with time adaptive cut-off frequency discrimination.
- Fang et al (U.S. Patent 6,757,395 B1) noise-adaptive spectral magnitude expansion method adapts the crossover point of spectral magnitude expansion in each frequency channel based on the noise and gain scale factor.

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25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel A. Nolan whose telephone number is (703)305-1368. The examiner can normally be reached on Mon, Tue, Thu & Fri, from 7 AM to 5 PM. If attempts to contact the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached at (703)305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 Customer Service Office at telephone number (703) 306-0377.

Daniel A. Nolan  
Examiner  
Art Unit 2654

DAN/d  
August 26, 2004



**RICHEMOND DORVIL**  
**SUPERVISORY PATENT EXAMINER**